

Research Article

Study About the Heavy Metals, an Utility of Gingers and the Relative Trees

An Nguyen Thi Ngoc*

University of Natural Science - Vietnam National University, Ho Chi Minh City, Vietnam

Abstract

In the world, the people develop more and more, increase according to geometrical series, while the provision, the foods increase according to arithmetical progression, foods are not enough supply the men, requirements of foods are high every day. Because of a producers want to have many profits, they use many insecticides, herbicides, a quantity is not exact or they use the excessive fertilizer. Therefore, an abeyance quantity is high, Nitrate is high, the heavy metal is presented and the health of the men are influenced. Ginger is a necessary food for the person, ginger has many utilities, especially, medicaments. Gingers can use the food such as: fragrant smell, cake, jam, ginger sweetmeat, licorice and ginger, kind of sweet used as dessert made of green peas and sugar, soya cake; the men adapt also, salted cabbage, pickled scallions, cook with brine, cook meats or fishes, bake, cook with water, cook with fowl, duck, oysters, helix; gingers can drink to tepid abdomen, assimilative, cure a belly ache; diminish a toxin of virus, cure the allergy, prevent to ferment fetidly, prevent the harmful virus. The gingers were used the medicament to cure many diseases such as: a cheat cold, a hot wind, the person was caught in a draft, a dumb, a nauseous; everyone uses the ginger to massage, cures to ache all over, makes the warm lung, strong heart. Therefore, the ginger has an important role in the life of men. Our object: we want to observe, analyze the heavy metals in ginger, study its use and the relative trees in order to improve the people.

Keywords

Food, Ginger, Heavy Metals, Diseases, Herbicides, Insecticides, Medicament

1. Introduction - Causes of Research

1.1. Introduction

Ginger is a kind of species in the cooking, making the cake, mostly, making the medicaments which can treat many diseases, therefore, many persons in the domestic and foreign countries prefer them [1, 10]. However, the farmers often use many chemical fertilizers, thus, there are the heavy metals which appear. Besides, if gingers are at the under hollow area, flood water, they will rotten fast and having the toxins,

everybody does not use them because they impact on health of the men.

- 1) Opening
 - a. Normal name: Ginger
 - b. Other name: Dried ginger
 - c. Scientific name: Zingiber officinale Roscoe
 - d. Family: Zingiberaceae [13].

*Corresponding author: ntnan9999@gmail.com (An Nguyen Thi Ngoc)

Received: 31 March 2025; **Accepted:** 19 June 2025; **Published:** 26 June 2025





Figure 1. Trees of ginger.



Figure 2. Root of ginger.

2) Description [11, 12]

Ginger is a kind of small tree, a herbaceous plants, leaves is long, a height from 0.6 to 1 meter, a rhizome grows root of ginger, leaves grow alternately, not petiole, having ocrea, scimitar image, a length from 15 to 20 centimeters, a width about 2 centimeters, a face of leave is lustrous, a midrib is slightly off pale white, a peel is fragrant, a flower axis depart from a tree stump it is long to 20 centimeters, a flower is long about 5 centimeters, wide is about 2 – 3 centimeters, brants with an egg shape is long about 2.5 centimeters, a calyx is long about 1 centimeter with 3 shorten teeth, 3 petals are long about 2 centimeters, outside it is green yellow, a petal edge is purple, stamen: much, however, everybody is rare to see the flowers.

According to Professor Pham Hoang Ho: Ginger is used such as: medicaments, spicy is from gingerol, shogaol and little of capsaicin. The essential oil, cineol, borneol, geraniol, oleoresin and more 500 chemicals that everybody knows in the ginger [11].

1.2. Causes of Research

We study about the ginger by many useful utilization and toxins of heavy metals in the ginger, too [2, 3, 5, 7].

1) A toxicity of Arsenic (As)

For everyone: when a quantity of toxin is exceedingly the threshold, mostly, in the plants, vegetables will influence to the health of persons. If this quantity is very much, there is a cause poisoning, when everybody is poisoned in a long time, there is a risk that causes a cancer a bladder, a kidney, a liver and a lung. As causes many diseases about the cardiovascular such as: blood pressure, it increased heart rate, and the illness of neuron. Especially, when everyone drinks water having Arsenic in the long time, he will have an acanthosis

nigricans and a skin cancer.

2) A toxicity of Lead (Pb)

For everyone: the men have an absorption indirect method by a food chain, or direct by many methods such as: a cutaneous respiration or direct by a digestion. Pb exists and accumulates in the human body at some point, it becomes a toxic which affects to health of the men. It makes a mental disorder, a headache, sometimes, it is serious illness, a convulsion, a delirium and finally, everybody is died, Besides, Pb accumulates in a bone and makes a bone is very harmful [4].

3) A toxicity Cadmium (Cd)

For everyone: Cd is not harmful much in the environment, but it accumulates in a kidney where Cd makes a renal dysfunction of men, it has a consequence to the health of the men. That is a food, the principal factor. It brings Cd to intrude to the body of men and when the men use a cigarette to smoke, too.

4) A toxicity of Copper (Cu)

For everyone: The gradient causes a poisoning, that is: everybody uses water by a system of a copper water pipe, he eats the food with a big quantity such as: ginger, grapes, mushroom, or an irrigation water having Cu... This is a poison for everyone, he can die when Cu stays in the body about 1g/1kg. Cu affects to the health of the men when it has a shortage or a redundancy.

5) A toxicity of Zinc (Zn)

For everyone: Zn is a necessary nutrient, it will make many illnesses when it has a shortage or a redundancy. In the body of the men, Zn accumulates in the liver, Zn has an ability to cause a hepatocellular carcinoma, a mutation, or a poisoning of nervous system, a sensitivity, a reproduction, or causes the toxins for the immune system.

2. Methods and Materials of Research

2.1. Methods

- 1) Time: Since January 2020 to 2021
- 2) Place: Binh My village, Cu Chi district, North of Ho Chi Minh city, this is a low – lying area, low; at months: 8, 9, 10 or a rainy season, here is flooded.
- 3) In the field: we want a good study, we must to go on the field, outside of the nature in order to observe, see models of ginger, contact with many farmers, learn about plant pests, insecticide, chemicals, fertilizer, herbicide, a crop productivity, a crop yield... went, we erring, gingers to analyze, and analyze soil, water, too, while we take care the heavy metals
- 4) In the laboratory: we want have an exact result, we must analyze, having the information, parameters, data... We must research and observe meticulously careful.
- 5) After having a result, we write a report.

2.2. Materials

- 1) Soil of a place studying
- 2) Gingers of a place studying
- 3) Tools to analyze.

3. Results and Discussion

Soil: A sample of soil is in a garden, there are many farms, populations and households.

Table 1. Result of the soil was analyzed.

Order	Analytical quota	Results	Methods
1	pH (H ₂ O)	5.17	Standard of VN 5979:2007
2	N total (%)	0.068	Standard of VN 6498:1999
3	P total (%)	0.076	Standard of VN 4052:1985
4	K total (%)	0.048	Standard of VN 6196-3:2000
5	N easy to digest (mg/100g)	2.0	Standard of VN 6443:2000
6	P ₂ O ₅ easy to digest (mg/100g)	1.16	Standard of VN 5256:1990
7	K ₂ O easy to digest (mg/100g)	2.34	Standard of VN 5254:1990
8	Humus (%)	1.43	Standard of VN 6442:2000
	Sandy (%)	12.80	
9	Emery	22.80	Standard of VN 5256:1990
	Clay (%)		
	Flesh (%)	64.40	
10	As (µg/kg)	1.75	ACIAR – AAS 001 - 2007
11	Cd (mg/kg)	0.444	ACIAR – AAS 004 - 2007
12	Cu (mg/kg)	19.44	ACIAR – AAS 015 - 2007
13	Pb (mg/kg)	8.953	ACIAR – AAS 015 - 2007
14	Zn (mg/kg)	4.38	ACIAR – AAS 019 - 2007

Comment: About the soil sample of studying place: pH is low, acid; N total and K total: poor; humus: poor soil, little of an organic matter; N is easy to digest: pool; P₂O₅ and K₂O: easy to digest: very poor, a ratio of sandy: little, a ratio of clay: average; and a ratio of flesh: much, >50% [14].

About the heavy metals: As, Cd, Cu, Pb, Zn: excessive regulation.
Ginger

Table 2. Result of ginger was analyzed.

Order	Analytical quota	Results	Methods
1	NO ₃ ⁻ (mg/kg)	137	AOAC& standard 2000
2	Humidity (%)	88.0	10TCN 302-97
3	Lipid (%)	0.18	AOAC 871.01-1997
4	Protein (%)	1.13	AOAC 987.04-1997
5	Glucose total (%)	5.78	AOAC 974.06-1990
6	Fiber (%)	2.24	AOAC 973.18C-1990
7	As (µg/kg)	< 0.3	ACIAR-AAS 001-2007

Order	Analytical quota	Results	Methods
8	Cd (mg/kg)	< 0.002	ACIAR-AAS 004-2007
9	Cu (mg/kg)	14.56	ACIAR-AAS 007-2007
10	Pb (mg/kg)	< 0.04	ACIAR-AAS 015-2007
11	Zn (mg/kg)	27.49	ACIAR-AAS 019-2008

Comment: About the heavy metals in gingers: As: <0.3µg/kg, it is higher than a regular level; Cd: <0.002, it is lower than a regular level; Cu, Pb, Zn: higher than a regular level [14].

In short, at the place that we study, everybody plants the gingers, we must prevent a flow of waste water in order to decrease the heavy metals, he must plant the gingers in the high place, it is noy flooded to be not waterlogging, the rotten ginger is toxic, it is harmful for the health of men. The acid soil, we can neutralize by fertilizers such as: algae, sea-shells, lime power [6, 7] ...

The principal use of ginger: we can tell: Ginger has many uses in the people from ginger, everybody makes the food, cakes, farms, cook or cures many diseases such as: a cold, a flu... In the country of Vietnam, the person like use at all seasons, mostly, in the fall and the winter, they use very much because the ginger warms digestive system [8, 9].

*Galanga officinale

Scientific name: *Alpinia officinarum* Hance

Family: Zingiberaceae [13]



Figure 3. *Galanga officinale* [13].

Everybody uses usually in the food, cook in the people, they use such as a medicament to cure the diseases of digestion, a stomach – ache, a cholera, a nausea and vomiting, a distention and bloating...

*Wild ginger

Scientific name: *Zingiber zerumbet* (L) J.E.Sm

Family: Zingiberaceae [13]



Figure 4. Wild ginger.

This is a kind of vegetables which live in the garden, a field. The men do not eat but they use zingiber zerumbet in order to cure the diseases such as: a stomach, a dysentery, a bronchitis; Ascaris, or the tonics.

4. Conclusion

The gingers and vegetables in the family Zingiberaceae are planted in the Ho Chi Minh City and in the plain, grow well and fast. Gingers have many useful roles, with gingers, everybody can make vegetable to eat, spice, marinate cake and candy, most importantly, cure diseases, that is popular in the people; ginger have a medical use very good. However, when we use them, we must pay attention to their living environment, mostly, a presentation of heavy metals that influence to the health of men [6, 15].

Abbreviations

pH	Potential of Hydrogen
N	Nitrogen
P	Phosphor
K	Kalium

Cu	Copper
Pb	Lead
Cd	Cadmium
As	Arsenic
Zn	Zinc
P ₂ O ₅	Phosphor Pentoxide
K ₂ O	Kali Oxide
NO ₃ ⁻	Nitrate

Author Contributions

An Nguyen Thi Ngoc is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

We declare no conflicts of interest.

References

- [1] An Nguyen Thi Ngoc (1996), Book: “*The necessities trees on garden in the South of Vietnam*”, Agricultural Publishing, Ho Chi Minh City, pages 06, 07.
- [2] An Nguyen Thi Ngoc (2004), Journal of Scientific Development, “*Study about the insecticides on the vegetable gardens in Ho Chi Minh City*”, pages 212-222.
- [3] An Nguyen Thi Ngoc (2004), Journal of Scientific Delopment, “*Study about Nitrat on the vegetable gardens in Ho Chi Minh City*”, pages 64-68.
- [4] An Nguyen Thi Ngoc (2005), Conference: Collection of studying results on 5 years “*Study about a quantity of Lead (Pb) on the green garden in Ho Chi Minh City*”, ISSN 1859-0128, pages 212 -222.
- [5] An Nguyen Thi Ngoc (2009), Conference of many Southern Universities “*Study about heavy metals on the green vegetable gardens*”, pages 83-90.
- [6] An Nguyen Thi Ngoc (2010), Book: “*The trees to cure the diseases and an environment*”, Agricultural Publishing, Ho Chi Minh City, pages 20, 21.
- [7] An Nguyen Thi Ngoc (2011), National scientific conference “*Study to plant the clean vegetable gardens in Loc Thanh vilage, Bao Lam district, Lam Dong province*”, ISSN 1859-4425, pages 83-96.
- [8] An Nguyen Thi Ngoc (2022), Book: “*Nutritional food and environment*”, Agricultural Publishing, Ho Chi Minh City, ISBN 978-604-603579-4, pages 15 -17.
- [9] An Nguyen Thi Ngoc (2022), Book: “*Food safety and hygiene and environment*”, Agricultural Publishing, Ho Chi Minh City, ISBN 978-604-603575-6, page 12.
- [10] Binh Nguyen Thanh (1963), “*Document of medicament*” pages 19, 20.
- [11] Ho Pham Hoang (1991 – 1993), Book: “*The trees of Vietnam country*”, Montreal Publishing, pages 30, 35, 42, 47.
- [12] Ho Pham Hoang (2006), Book: “*The medicinal trees at Vietnam*”, Tre Publishing, pages 593, 594, 595.
- [13] Loi Do Tat (1997), Book: “*The medicinal trees of Vietnam*”, Publishing of Science and Technology, pages 27, 40.
- [14] Medicinal Ministry (2011), Book: “*National Technical regulation on the limits of metals contamination in food*”, pages 4, 6.
- [15] Quyen Mai Van and alts (1996), Book: “*Fresh herbes at Vietnam*”, Agricultural Publishing, Ho Chi Minh City, page 8.